



3901 Liberty Street Road • Aurora, Illinois 60504-8122
Telephone: 630.851.7330 • Fax: 630.851.9309

October 10, 2007

Commonwealth of Massachusetts
Board of Fire Prevention Regulations
Board of Building Regulations and Standards

Dear Board Members:

First Alert, Inc. wishes to provide the following information to this joint meeting of the Board of Fire Prevention Regulations and the Board of Building Regulations and Standards, concerning smoke alarms for consideration before Massachusetts alters any codes relating to smoke alarms or announcing any preference for one type of smoke alarm technology over another. We welcome the opportunity for a reasoned scientific discussion of these important issues.

All major manufacturers of smoke alarms sell alarms with ionization, photoelectric, and dual-sensors (which contain both ionization and photoelectric technology). First Alert is proud to be the first smoke alarm manufacturer to offer dual-sensor alarms, and those alarms have been available to consumers since the 1980s. All First Alert® and BRK® smoke alarms meet or exceed all regulatory requirements, including UL217 (the applicable smoke alarm standard) and are tested for compliance with that standard. UL217 is written and revised by the Standards Technical Panel for the Underwriters Laboratories, which includes members of various safety organizations, interested parties (including fire safety experts), and manufacturers of smoke alarms.

Smoke alarms are designed to detect smoke particles and alarm when certain thresholds are met. When smoke enters an ionization alarm, ionized air molecules attach to the smoke particles and reduce the ionizing current, triggering the alarm. When smoke enters a photoelectric alarm, light from a pulsating light source is reflected off the smoke particles onto a light sensor, triggering the alarm. Smoke particles of varying number and size are produced in all fires. Ionization technology is generally more sensitive than photoelectric technology at detecting small particles, which tend to be produced in greater amounts by flaming fires, which consume combustible materials rapidly and spread quickly. Sources of these fires may include paper burning in a wastebasket, or a grease fire in the kitchen. Photoelectric technology is generally more sensitive than ionization technology at detecting large particles, which tend to be produced in greater amounts by smoldering fires, which may smolder for hours before bursting into flame. Sources of these fires may include cigarettes burning in couches or bedding. Supported by numerous studies and research by organizations, including NFPA, NIST, USFA, IAFC and others, the conclusion is both technologies will detect smoke and provide protection.



Nevertheless, First Alert and many other fire-protection organizations and experts recognize the differences in smoke-alarm technology, and, as a result, they recommend, for maximum protection, that the public use both photoelectric and ionization smoke alarms – or, alternatively, dual-sensor smoke alarms, on every level of a home and, particularly, in every bedroom. It is important to note that fire experts, based on decades of studies concerning the effectiveness of smoke alarms, have concluded that the most important factor for residential fire safety is the number of smoke alarms placed in a home -- properly located, properly powered, and properly maintained; it is not the technology utilized.

Smoke alarms have been credited with saving thousands of lives each year. In fact, the National Fire Protection Association (“NFPA”) has recognized that smoke alarms were the most significant fire safety advancement of the 20th Century. During that time frame, the most prevalent form of smoke alarm technology in use throughout the country was, and continues to be, ionization.

Fire experts from the United States Fire Administration, Underwriters Laboratories, National Fire Protection Association, the National Institute of Standards and Technology, and the U.S. Consumer Products Safety Commission have tested and analyzed photoelectric and ionization technology extensively and have concluded that both photoelectric and ionization technology provide sufficient time for escape in most residential fires. Numerous quotes from these entities and excerpts from studies supporting this statement are being provided to this Committee.

Significantly, there are price differences between smoke alarms based on the technology utilized and other features. Smoke alarms with dual-sensors are the most expensive alarms. Photoelectric smoke alarms are less expensive, and ionization smoke alarms are the least expensive.

First Alert has sampled retail prices of smoke alarms in the Boston and surrounding areas. The average retail price, not including tax, was:

- Ionization Alarm: \$13.39
- Photoelectric Alarm: \$17.99
- Dual-Technology Alarm: \$27.97

First Alert recognizes that some consumers cannot afford both technologies in separate alarms or the cost of dual-sensor alarms. For example, to equip a standard three-bedroom residence with ionization alarms in accordance with NFPA recommendations, the cost would be approximately \$67. For photoelectric alarms, the cost would be \$90, and, for dual-sensor alarms, the costs would be \$140. As a result, First Alert, like the other residential smoke alarm manufacturers in the United States, manufactures and



sells to consumers dual-sensor, photoelectric, and ionization smoke alarms. By legislating a more expensive technology over a less expensive technology, the result may be that consumers purchase fewer smoke alarms, thus resulting in less protection for their families.

Moreover, if Massachusetts should completely ban the use of ionization technology, it will be dismissing the recommendations of various fire-safety organizations for maximum fire-warning protection. Again, those organizations recommend that consumers utilize both technologies, either in the joint use of separate detectors, one utilizing ionization technology and the other utilizing photoelectric technology, or in the form of a dual-sensor alarm, on every level of the home and in every bedroom. This recommendation has been included on First Alert's packaging and web site for years. That packaging also provides consumers with suggested locations for the placement of smoke alarms for residences, and explains the differences between the types of technology.

In conclusion, pursuant to the recommendations of the NFPA and many fire experts, which are based on decades of studies on smoke-alarm effectiveness, First Alert recommends that Massachusetts afford its citizens the opportunity to purchase dual-sensor, photoelectric, and ionization smoke alarms, and believes that eliminating ionization technology could result in Massachusetts residents being afforded less protection as opposed to increased protection in the case of a residential fire.

Sincerely,

Mark Devine
V.P. of Product Development
BRK Brands / First Alert

Attachment of Quotes from Studies



Collection of Studies and Associated Quotes Regarding Smoke-Alarm Technology

Studies	Quotes
Protecting Your Family From Fire, FEMA and USFA, August 2002	"Both types (ionization and photoelectric) provide good protection and can be used without worry"
UL Website, Product Safety Tips, ul.com/consumers/smoke.html	"While photoelectric smoke alarms generally respond faster to smoldering smoke conditions and ionization alarms generally respond faster to flaming fire conditions, both types provide adequate protection against fire."
NFPA Website, Fact Sheet on Fire Protection Equipment	"Smoke alarms are the residential fire safety success story of the past quarter century."
NFPA Website, Fact Sheet on Fire Protection Equipment	"Either type of alarm will detect nearly every type of fire quickly."
Home Smoke Alarms, NFPA Home Safety Pamphlet	"Both types provide adequate protection."
Fire Prevention Tips For Your Home, NFPA Pamphlet	"There are different sensor technologies, some faster to react when fires are smoldering, others faster when fires are openly flaming, all are fast enough to provide sufficient warning."
Fire Prevention Tips For Your Home, NFPA Pamphlet	"All laboratory tested smoke alarms, regardless of type, will protect you if they are installed and maintained properly."



Position Paper, Smoke Alarms – Ionization and Photoelectric Technology, Fire and Life Safety Section of the International Association of Fire Chiefs (August 21, 2007)

“Smoke alarms that use either [ionization or photoelectric] type of sensing technology have been proven to save lives, prevent injuries, and minimize property damage by detecting and alerting residents, and that the risk of dying from fires in a home without smoke alarms is twice as high as in homes that have working smoke alarms.”

What You Should Know About Smoke Detectors, CPSC

“[T]he best information currently available is that either type can provide adequate home fire protection.”

Smoke Detectors, CPSC

“Each type of detector, if properly installed and maintained, is effective.”

USFA Website, Smoke Alarms, Protect Yourself and Your Family Today!

“Because both ionization and photoelectric smoke alarms are better at detecting distinctly different yet potentially fatal fires, and because homeowners cannot predict what type of fire might start in a home, the USFA recommends the installation of both ionization and photoelectric or dual-sensor smoke alarms.”

Ionization and Photoelectric Smoke Alarms, National Association of State Fire Marshals

“Experts recommend that a home have both ionization and photoelectric alarms or dual alarms to ensure the fastest response to both flaming and smoldering fires.”

Detector Sensitivity and Siting Requirements for Dwellings, Phase I, 1975; U. S. Department of Commerce, National Bureau of Standards

“It appears there is no difference in life saving potential between ionization and photoelectric detectors under expected residential fire conditions when taken as a whole.”

Detector Sensitivity and Siting Requirements for Dwellings, Phase II, 1977 U. S. Department of Commerce, National Bureau of Standards

“[T]here is no apparent difference in life saving potential between ionization and photoelectric detectors under the fire conditions tested during this series.”



Performance of Home Smoke Alarms, Analysis of the Response of Several Available Technologies in Residential Fire Settings, 2003, National Institute of Standards and Technology

"Smoke alarms of either the ionization type or photoelectric type consistently provided positive escape times."

Studies Assess Performance of Residential Detectors, National Institute of Standards and Technology, Richard W. Bukowski

"All of these studies [which include a review of over 200 studies] presented conclusions that were essentially identical:

When either ionization or photoelectric smoke detectors are located outside bedrooms and on each level of a house, they provide adequate warning to allow occupants to evacuate along their normal egress routes in most residential fire scenarios...."

Keeping the Smoke Detectors Operational: The Dallas Experience, Inside Fire Journal, July/August, 1987, William Jernigan, Ph.D.

"There is no known instance in which a properly installed and maintained smoke detector supplied by the Dallas Fire Department during the project failed to react to the ignition of a fire..." (the project used only ionization-type alarms)

Surveillance and Prevention of Residential Fire Injuries, The New England Journal of Medicine, July 4, 1996, Sue Mallonee, R.N. M.P.H., et al.

"The results of this study confirm that the presence of smoke alarms in homes helps prevent fire-related injuries..." (all smoke alarms used in the study were ionization-type)

An Analysis of the Performance of Residential Smoke Detection Technology, Utilizing the Concept of Relative Time, 2007, Elizabeth Milarick, Stephen M. Olenick and Richard Roby

"While ionization alarms are generally faster at detecting smoke from flaming fires and photoelectric alarms are generally faster at detecting smoke from smoldering fires, ionization, photoelectric, and combination detectors provide statistically equivalent warning to different types of fires."